

Having described our invention, we claim:

1. A refrigerant material transfer device for transferring a refrigerant from a pressurized container to the connector on an automotive air conditioning system including:

an actuator adapted for attachment to the pressurized container for selectively receiving refrigerant material from the pressurized container,

a quick connect fitting fluidically connectable to the automotive air conditioning system,  
a fluid conveying tube fluidically connecting said fitting and said actuator to allow the flow of refrigerant material from said actuator to said quick connect fitting,

said quick connect fitting having

a one piece plastic body having one end attached to said tube and another end selectively attachable to and detachable from the air conditioning connector on the automotive air conditioning system, said plastic body having a fluid passageway extending from said one end attached to said fluid conveying tube to said other end for fluidically connecting to the automotive air conditioning system and,

a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the air conditioning connector,

one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the air conditioner connector, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the air conditioning connector and an unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said

locking tabs in said secured position.

2. A refrigerant material transfer device as described in claim 1 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking tabs in said secured position.

5 3. A refrigerant material transfer device as described in claim 2 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

10 4. A refrigerant material transfer device as described in claim 1 in which said one of said body and said locking sleeve has at least one aperture therein for receiving said one locking tab therein.

15 5. A refrigerant material transfer device as described in claim 1 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

6. A refrigerant material transfer device as described in claim 1 in which said one locking tab includes a plurality of locking tabs.

20 7. A refrigerant material transfer device as described in claim 1 in which said body or said locking sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

8. A refrigerant material transfer device as described in claim 7 in which said one assembly prong is formed at angle toward said body or said locking sleeve not having said prong

thereon.

9. A refrigerant material transfer device as described in claim 7 in which said body or said locking sleeve not having said prong thereon having a raised stop portion for restraining disassembly of said body and said locking sleeve.

5 10. A refrigerant material transfer device as described in claim 1 in which said body has said one locking tab integrally formed therewith, and said locking sleeve has at least one assembly prong, said body having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said  
10 body and said locking sleeve.

11. A refrigerant material transfer device as described in claim 1A in which said quick connect fitting has a check valve that allows refrigerant to flow into the automotive air conditioning system through the air conditioning connector and restrains flow of refrigerant out of the automotive air conditioning system, said check valve having

15 a check valve ball and

a plastic valve cage having an inlet end fluidically connected to said fluid passageway of said plastic body and having said ball positioned adjacent said inlet end of said valve cage, said inlet end of said valve cage having an enlarged body connecting portion with a front surface, said valve cage having an outlet and a valve cage fluid passageway extending between said inlet end  
20 and said outlet, said inlet end of said valve cage having at least one ball valve holding portion and at least one non sealing passageway adjacent said one ball valve holding portion to allow the flow of fluid around said ball and into said valve cage fluid passageway, said plastic body having an

integral pocket formed to receive said enlarged body connecting portion of said valve cage therein and secure said valve cage to said body, said pocket having a retaining surface, said retaining surface in contact with said front surface of said valve cage to secure said valve cage in said pocket.

5           12. A material transfer device for transferring material from a pressurized container to another connector including:

          a quick connect fitting for fluidically connecting to the connector, said quick connect fitting having

          a one piece plastic body having one end for receiving material from the pressurized container and another end selectively attachable to and detachable from the connector, said plastic body having a fluid passageway extending from said one end to said other end and,

          a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the connector,

          one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the connector, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the connector and an unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position.

20           13. A material transfer device as described in claim 12 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking

tabs in said secured position.

14. A material transfer device as described in claim 13 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

5 15. A material transfer device as described in claim 12 in which said one of said body and said locking sleeve has at least one aperture therein for receiving said one locking tab therein.

16. A material transfer device as described in claim 12 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

10 17. A material transfer device as described in claim 12 in which said one locking tab includes a plurality of locking tabs.

15 18. A material transfer device as described in claim 12 in which said body or said locking sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

19. A material transfer device as described in claim 18 in which said one assembly prong is formed at angle toward said body or said locking sleeve not having said prong thereon.

20 20. A material transfer device as described in claim 18 in which said body or said locking sleeve not having said prong thereon having a raised stop portion for restraining disassembly of said body and said locking sleeve.

21. A material transfer device as described in claim 12 in which said body has said one locking tab integrally formed therewith, and said locking sleeve has at least one assembly prong, said body having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

22. A material transfer device as described in claim 12 in which said quick connect fitting has a check valve that allows refrigerant to flow into the automotive air conditioning system through the air conditioning connector and restrains flow of refrigerant out of the automotive air conditioning system, said check valve having

a check valve ball and

a plastic valve cage having an inlet end fluidically connected to said fluid passageway of said plastic body and having said ball positioned adjacent said inlet end of said valve cage, said inlet end of said valve cage having an enlarged body connecting portion with a front surface, said valve cage having an outlet and a valve cage fluid passageway extending between said inlet end and said outlet, said inlet end of said valve cage having at least one ball valve holding portion and at least one non sealing passageway adjacent said one ball valve holding portion to allow the flow of fluid around said ball and into said valve cage fluid passageway, said plastic body having an integral pocket formed to receive said enlarged body connecting portion of said valve cage therein and secure said valve cage to said body, said pocket having a retaining surface, said retaining surface in contact with said front surface of said valve cage to secure said valve cage in said pocket.

23. A method of assembling a material transfer quick connect fitting device including the steps of

positioning the inlet end of a plastic body adjacent the assembly end of a plastic locking sleeve having a central aperture therethrough and having prongs formed integrally therewith,

5 moving said locking sleeve over said inlet end of said plastic body toward the outlet end of said plastic body with said central aperture of said locking sleeve partially receiving the outer surface of said body therein.

moving the assembly end of said locking sleeve towards the outlet end of said body to deform said prongs by contact with said outer surface of said body, and

10 positioning said prongs in a depression in said plastic body, wherein said depression has a stop surface to restrain movement of said assembly end of said sleeve towards said inlet end of said body, said body having a locking tab formed integrally therewith, said locking sleeve is spaced from said locking tab when said prongs are in said depression.

24. A product made by the method as claimed in claim 23.

15 25. A method of assembling a material transfer quick connect fitting device as described in claim 23 which includes the steps of

positioning a check valve ball in a chamber forming a portion of a fluid passageway extending from said inlet end of said body, and

20 moving the body connecting portion of a plastic valve cage into a pocket formed in said body adjacent said chamber to secure said check valve ball and said valve cage to said body with said check valve ball and said valve cage in fluid communication with said fluid passageway.

26. A product made by the method as claimed in claim 25.

27. A method of attaching a refrigerant material transfer device to the connector on an automotive air conditioning system including the steps of:

positioning a quick connect fitting having a fluid passageway adjacent a fluid passageway of said air conditioning connector,

moving said fitting and said connector together to pivotally move the connector engaging lip of a locking tab formed integrally with a plastic body of the quick connector into engagement with a depression in the air conditioning connector so that said fluid passageways of said fitting and said connector are in fluid communication with each other,

moving the locking collar of said quick connect fitting along said body of said fitting to contact said connector engaging lip and lock said connector engaging lip in said depression of said connector.

28. A method of attaching a refrigerant material transfer device to the connector on an automotive air conditioning system as described in claim 27 in which the step of moving said fitting and said connector together includes the step of opening a valve in said fluid passageway of said connector.

29. A method of attaching a refrigerant material transfer device to the connector on an automotive air conditioning system as described in claim 27 in which the step of moving said fitting and said connector together includes the steps of pivotally moving said connector engaging lip away from said connector and pivotally moving said connector engaging lip towards said connector and into said depression.